

SWBAT

answer AP style  
questions about  
Newton's Laws

Sep 4-7:31 AM

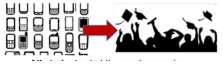
SECA CP Physics  
Tuesday 29 March 2016

**Welcome!!!**

H. Leslie Grebe  
Room C-244

Centering  
(puzzle)

PEDs with Passing



- Show me SchoolView if you want phone in class...

**HOMEWORK:** Solve partner's push friction problem

**Opening Activity: Quick Write**

What is Newton's 3rd Law of motion? How would it apply to an apple and the earth?

TEMPERATURE

Temp Rise? falling temp?  
Temp Drop?

HEART

Broken heart +

<http://wordsandnotesandchords.blogspot.com/2011/05/words-puzzles-wuzzles.html>

Sep 7-7:04 AM

Newton's Laws Practice Test.docx

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Newton's Laws Practice Test

2. The upward acceleration of an elevator is 1.5 m/s<sup>2</sup> and its mass is 5200 kg. What is the upward force of the cable pulling the elevator up?

Handwritten notes:

- $F_{fric} = \mu \cdot F_{norm}$
- $W = m \cdot g$  (with  $F_{grav}$  written below)
- $F_{NET} = m \cdot a_{NET}$  (with  $\downarrow$  and  $\sum$  written below)
- Diagram of an elevator with forces:  $T$  (up),  $F_{GRAV}$  (down), and  $a_{NET} = 1.5 \text{ m/s}^2$  up.
- Diagram of a projectile path with points P, Q, and R.

Mar 29-9:48 AM

### What we should have solid:

Memorize our ~~5~~ vocab cards, units, vector or not, definition, formula

Be able to answer distance vs displacement questions

Be able to make measurements of real-life motion. Know what is likely to make timing things difficult and how to get more reliable timing results

Be able to convert between miles and meters, between hours, minutes, and seconds

Be able to calculate speed = dist/time and velocity = disp/time

Know what all of the symbols in the UAM equations stand for and mean

Be able to turn a UAM word problem into a list of knowns and unknowns

Be able to pick the equation with those 4 things in it

Be able to put the knowns into that equation

(Be able to solve for the unknown)

→ PROJECTILES:  $V_x$  IS CONSTANT;  $a_y = -9.81 \text{ m/s}^2$   <sup>$V_y$  CHANGES</sup> PG 42

PG 43 TIME,  $\Delta t$ , CONNECTS  $x$  &  $y$

PG 53 1<sup>ST</sup> LAW,  $\Delta t$ , CONNECTS  $x$  &  $y$

PG 49 VECTORS INTO  $x$  &  $y$ , ADD VECTORS

PG 59 DIFFERENCE BETWEEN MASS & WEIGHT

PG 61 NET FORCE

PG 63 FREE BODY DIAGRAMS

PG 70  $F_f = \mu \cdot N$

$$F = m \cdot a$$

QW every day to review - gather responses to front board.

Dec 4-9:15 AM

InterActive Notebook - Table of Contents			
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Sep 5-9:09 AM

We need a test soon... Let's start practicing

## SURVEY

Group work: Pick a role

\* ☒ Notes/Equations

\* Diagrammer

\* Recorder

\* Time manager

\* Overview / Eye on the Prize

$$m \cdot a_{\text{net}} = F_{\text{NET}} = \underbrace{(T)}_{\substack{\text{7800N} \\ \text{7800N}}} - W$$

$$7800\text{N} = T - 50,960\text{N}$$

$$58,760\text{N} = T$$

Mar 28-9:07 AM

## Pg 75: Newton's 3rd Law

In outer space, how do space vehicles change direction, speed up, or slow down?

<http://www.youtube.com/watch?v=P8sUVhR7xiI>

SHOOT OR THROW SOMETHING  
THE OPPOSITE WAY {WALL-E & EXTINGUISHER}

Demo: 2 carts

What do you think is going to happen?

PULLER, HOLDER, BOTH

What did we observe?

NO MATTER WHO PULLED / HELD, BOTH MOVED

Two spring scales:

BOTH SCALES READ THE SAME

NO MATTER WHICH ONE OR HOW HARD WE PULL.

Newton's 3rd Law:

For every **action** force, there is an equal and opposite **reaction** force!

SIZE                  DIRECTION (VECTOR)

I push on the wall. Does the wall push back?

YES, OR I'D FALL OVER

YOU CAN'T TOUCH WITHOUT BEING TOUCHED.

## HORSE ÉCART:

HORSE MOVES BY PUSHING ON THE GROUND

## STORY OF THE PUPPY

$$m_{\text{pulley}} A = F_{\text{pulley}} = F_{\text{RUS}} = M \cdot a_{\text{RUS}}$$

Mar 17-8:05 AM



Mar 29-10:37 AM

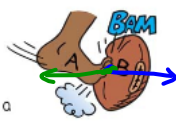
Worksheet

- Forces shown as arrows
- start at the point of contact

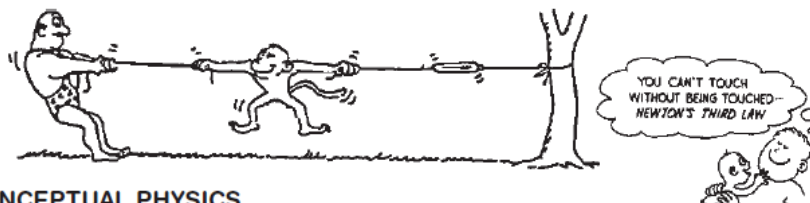
**ACTION FORCE** FOOT KICKS BALL

**REACTION FORCE** BALL HITS FOOT

**SAME SIZE & OPPOSITE DIRECTION**



2. Draw arrows to show the chain of at least six pairs of action-reaction forces below.



CONCEPTUAL PHYSICS

MC on back: circle up, thumbs

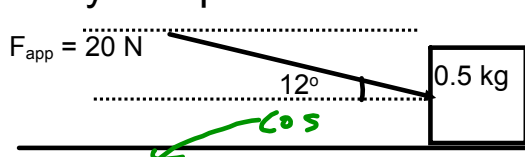
Sep 21-2:13 PM

Trade questions with someone...

$F_{app}$ ,  $m$ ,  $ANGLE$ ,  $\mu$

Pg 49, 69, physicsgrebe2

If I push on a block like in this diagram, what are the x & y components of that force?



$F_{app} = 20 \text{ N}$

$0.5 \text{ kg}$

$12^\circ$

$\mu = 0.2$

$X = \text{adj}$

$Y = \text{opp}$

$H = 20 \text{ N}$

$\sin \rightarrow \frac{\text{opp}}{20} = \sin(12) \cdot 20$

$\text{opp} = \text{NEGV } -4.15 \text{ N DOWN}$

$\cos \rightarrow \frac{\text{adj}}{20} = \cos(12) \cdot 20$

$= 19.56 \text{ N}$

Mar 16-7:56 AM

Putting it all together...

Diagram: A block of mass  $m = 1.0 \text{ kg}$  is on a horizontal surface with coefficient of friction  $\mu = 0.2$ . A force  $F_{\text{app}} = 20 \text{ N}$  is applied at an angle of  $15^\circ$  above the horizontal. The block is labeled with  $0.5 \text{ kg}$  and  $1.0$ .

a) Free-body diagram showing forces:  $F_{\text{norm}} = N$  (up),  $F_{\text{app}}$  (up and right),  $F_{\text{fric}}$  (left), and  $F_{\text{grav}} = W$  (down).

b) Vector diagram for the applied force  $F_{\text{app}} = 20 \text{ N}$  at  $15^\circ$ . Components are calculated using SOH and CAH:

$$20 \cos 15^\circ = \frac{F_x}{20 \text{ N}} \Rightarrow F_x = 19.3 \text{ N}$$

$$20 \sin 15^\circ = \frac{F_y}{20 \text{ N}} \Rightarrow F_y = 5.2 \text{ N}$$

c) Free-body diagram showing forces:  $F_{\text{norm}} = 5.2 \text{ N}$  (up),  $F_{\text{app}}$  (up and right),  $F_{\text{fric}}$  (left), and  $F_{\text{grav}}$  (down).

d) BALANCED FORCES  $\sum F = 0$

$$5.2 \text{ N} + F_{\text{norm}} - F_{\text{grav}} = 0$$

$$5.2 \text{ N} + F_{\text{norm}} - (m \cdot g) = 0$$

$$5.2 \text{ N} - 9.81 \text{ N} + F_{\text{norm}} = 0$$

$$-4.61 \text{ N} + F_{\text{norm}} = 0$$

$$F_{\text{norm}} = 4.61 \text{ N UP}$$

e) Friction force calculation:

$$F_{\text{fric}} = \mu \cdot F_{\text{norm}} \Rightarrow \mu = 0.2$$

$$F_{\text{fric}} = ?$$

$$F_{\text{norm}} = 4.61 \text{ N}$$

$$F_{\text{fric}} = \mu \cdot F_{\text{norm}} = 0.2(4.61 \text{ N}) = 0.922 \text{ N LEFT}$$

f) Net force in the x-direction:

$$\sum F_x = m \cdot a_x$$

$$F_{\text{appx}} - F_{\text{fric}} = m \cdot a_x$$

$$19.3 \text{ N} - 0.922 \text{ N} = 1.0 \text{ kg} \cdot a_x$$

Mar 14-7:43 AM